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(56) Documents Cited

US 4346840 A

WPI Abstract Accession Number 97-188269 and

JP09048686 WPI Abstract Accession Number  
97-014845 and JP08280381 WPI Abstract Accession  
Number 95-388829 and JP07265400 WPI Abstract  
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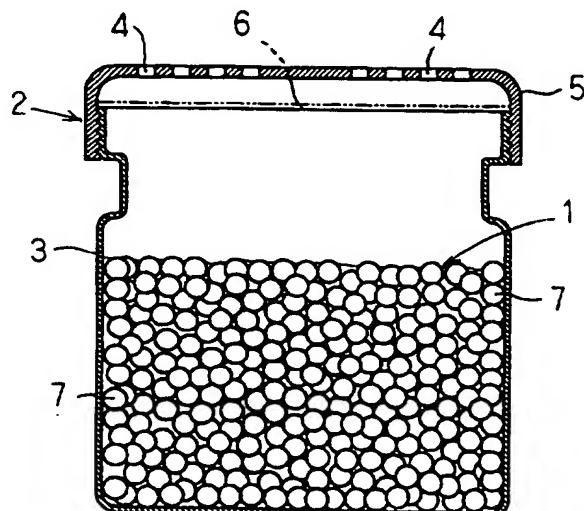
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(54) Abstract Title

A deodorant including microorganisms

(57) A deodorant includes microorganisms which remove unpleasant odours by catabolising and digesting the agents which cause such odours. In one embodiment, a liquid deodorant is accommodated within a container 2 together with particulate water-holding material 7 of a such size to prevent the particles from flowing out through ventilation apertures 4 provided through a lid 5 fitted over an upper opening of the container body 3. Preferably the deodorant includes one or more of the following microorganisms: bacillus subtilis which produces proteolytic and amylosis enzymes, bacillus licheniformis which produces lipolysis enzymes and bacillus polymxa or bacillus subtilis cellulase, both of which produce cellulolytic enzymes. The particulate water holding material may be formed of an isobutylene/maleic anhydride copolymer cross linked with sodium salt. The deodorant may be used in septic tanks, toilets or living rooms.

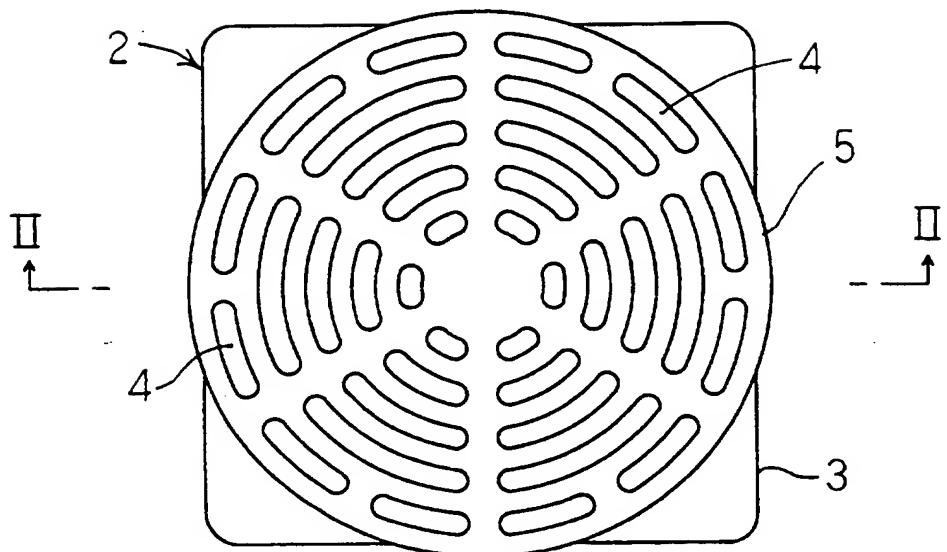
FIG. 2



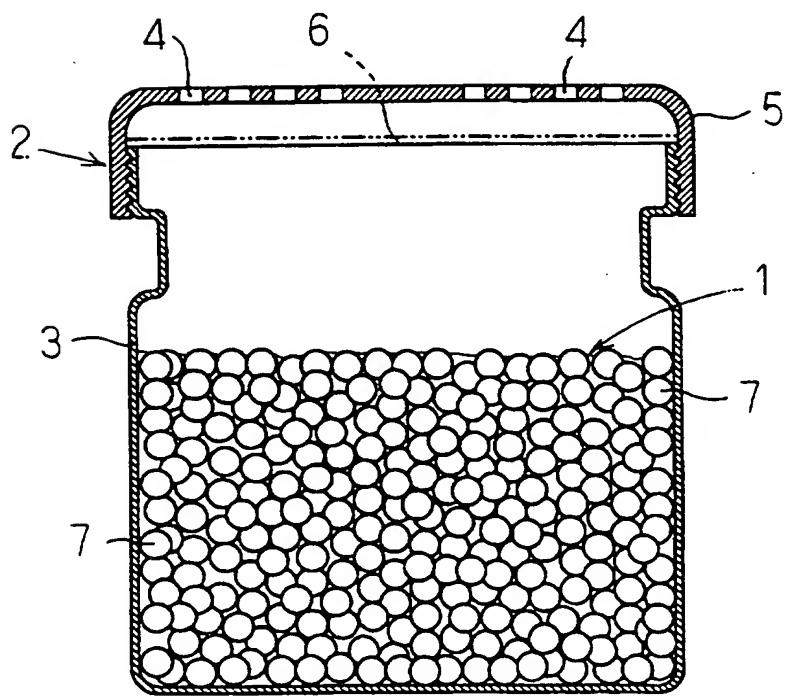
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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

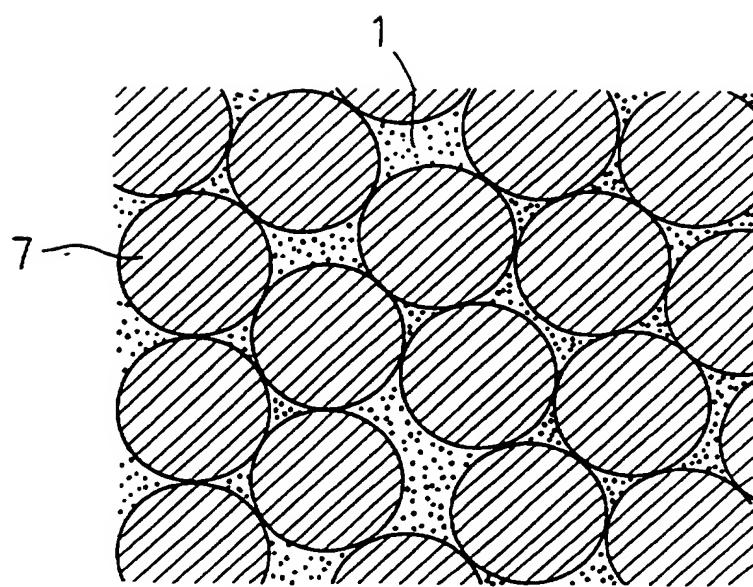
F I G. 1



F I G. 2



F I G. 3



## A DEODORANT INCLUDING MICROORGANISMS

The present invention relates to deodorants including bacteria or microorganisms catabolizing and digesting organic matter which causes odour.

There are a number of deodorants in the art, such as those employing chemicals and those employing enzymes produced by culturing

5 microorganisms.

In the prior art, a liquid deodorant, used in a room such as the toilet or the living room, is accommodated within a container covered by a lid through which a plurality of apertures are provided. In this connection, there is a disadvantage that such a liquid deodorant is apt to flow out of the container

10 upon tilting or tipping over the container. This often causes soiling of surrounding areas.

Accordingly, an object of the present invention is to provide an improved deodorant including microorganisms. It is preferable that the deodorant, if in liquid form, is prevented from flowing out from the container

15 if the container is tilted or tipped over.

According to the present invention, a deodorant includes microorganisms catabolizing and digesting organic matter as a causive agent of malodour.

The deodorant may be a liquid accommodated within a container together with discrete water-holding material(s) of a size sufficient to prevent

20 the material(s) from flowing out through ventilating apertures provided through a lid to be fitted over an upper opening of a body of the container.

Said water-holding material(s) of the deodorant may be formed of isobutylene-maleic anhydride copolymer crosslinked with sodium salt.

Said microorganisms may be either one of the following microorganisms

25 having a productivity of amylosis enzyme; microorganisms having a productivity of proteolytic enzyme; microorganisms having a productivity of lipolysis enzyme for catabolizing the vegetable or animal fat; or microorganisms having a productivity of cellulolytic enzyme; or may compris or contain any

two or more of these microorganisms blended in an optimum percentage.

Reference will now be made to the accompanying drawings, in which:

Fig. 1 is a plan view showing a container for accommodating a deodorant embodying the present invention.

5 Fig. 2 is a sectional side elevational view along the line II-II of Fig. 1.

Fig. 3 is an enlarged sectional view showing the water holding materials.

A preferred embodiment of a deodorant in accordance with the present invention will now be described in detail with reference to the accompanying drawings.

10 The deodorant embodying the present invention includes one or more bacteria or microorganisms, such as one or more of those listed below, in a predetermined optimum percentage.

- the *bacillus subtilis* having a productivity of amylase as amylosis enzym and protease as proteolytic enzyme;

15 - the *bacillus licheniformis* having a productivity of lipase as lipolysis enzyme; and

- the *bacillus polymxa* or the *bacillus subtilis* cellulase having a productivity of protopectiase or cellulase as cellulolytic enzyme.

20 Each of said above mentioned microorganisms is a sporangium one, and resistances thereof to heat or chemical agent are remarkable in its spore condition so that it can be stored in a stabilized condition.

In the deodorant, one or more of the above listed bacteria are added to a mixture of water, surface active agent, rot proof agent, chelating agent, and stabilizing agent, so that the number of the bacteria present in the mixture is 25 within the range from  $1 \times 10^6/\text{ml}$  to  $1 \times 10^9/\text{ml}$ .

The surface active agent is adapted to be added to the mixture in order to facilitate the contact of the microorganisms with the surface of the organic matter as a causative agent of malodour. Preferably, a surface active agent of a non-ionic type such as ethoxylate or alkylphenol is employed, because the 30 affection to be acted upon the activity and propagation of the bacteria is light.

The rot proof agent is adapted to be added to the mixture to prevent bacteria other than those required from propagation. For example, 1,2-benzisothiazolin-3-1 is employed as the rot proof agent.

5 The chelating agent and stabilizing agent are adapted to be added to the mixture to suppress the proliferation of microorganisms contained within the deodorant to stabilize the composition thereof. For example, Tetrasodium-Ethylenediaminetetraacetate is utilized as the chelating agent, and dipropylene glycol and sodium hydroxide are utilized as the stabilising agent.

10 Other additives, for example a colouring agent such as opacifier and pigment, or perfume can be added.

The composition of the deodorant is as follows:

	ethoxylate or alkylphenol as surfactant;	3-5 %
	1,2-benzisothiazolin-3-1 as rot proof agent;	less than 1 %
15	Tetrasodium-Ethylenediaminetetraacetate as chelating agent	less than 1 %
	dipropylene glycol and sodium hydroxide as stabilizing agent;	less than 1 %
	opacifier;	0.05%
20	water;	the rest
	microorganisms;	$1 \times 10^7/\text{ml}$

25 In the case that the deodorant having a composition as listed above is employed for the purpose of deodorizing the leftover or the septic tank for sewage, the deodorant may be applied directly thereto. However, in the case that the deodorant is intended to be utilized for the purpose of deodorizing the space within a room such as a toilet or living room, the deodorant is adapted to be contained within a container 2, as shown in Figs. 1 and 2.

The container 2 includes a container body 3 having an upper opening. A lid 5 having ventilating apertures 4 is adapted to be removably fitted to the 30 opening of the container. Before it is put to use, the container is sealed by an

inner lid 6 as shown in Fig. 2 by a phantom line. When it is intended to utilize the deodorant, the lid 5 is removed and then the lid 6 is also removed, whereafter the lid 5 is attached to the container again.

5 Deodorant 1 is contained within the container 2 together with a particulate, granular or pelletised or the like water holding material 7. Each of the pieces of the materials 7 is of a size such that it cannot be passed through the apertures 4 while in its wetted condition. For example, isobutylene-maleic anhydride copolymer crosslinked with sodium salt is employed as the water holding material.

10 The major part of the deodorant 1 as well as microorganisms contained therein are absorbed and supported by water holding materials 7. Upon evaporation of the moisture of the deodorant, microorganisms are adapted to be entrained therewith to pass through the apertures provided through lid 5 and diffused into the space within the room.

15 The microorganisms diffused into the space in the room adsorb the organic matter which causes unpleasant odours, catabolize and digest the organic matter, and take in nutrition therefrom, and gain energy to continue the activity of catabolizing and digesting the organic matter.

20 More particularly, the *bacillus subtilis* secretes amylase as amylosis enzyme and protease as proteolytic enzyme to catabolize the starch and the protein, the *bacillus licheniformis* secretes lipase as lipolysis enzyme to catabolize the vegetable or animal fat, and the *bacillus polymxa* or the *bacillus subtilis* cellulase secretes protopectiase or cellulase as cellulolytic enzyme to catabolize the cellulose.

25 The microorganisms to be utilized must possess characteristics which do not affect human health. The above listed microorganisms of *Bacillus* family exist in nature, and they are inherently safe.

30 Although the *bacillus subtilis*, the *bacillus licheniformis*, the *bacillus polymxa* or the *bacillus subtilis* cellulase are utilized as microorganisms in the abov menti ned embodiment, some of these microorganisms can be used, and

the other microorganisms which can secrete the same enzyme can be used, provided the safety thereof is ascertained.

In accordance with the present invention, microorganisms included within the deodorant will catabolize and digest the organic matter which causes unpleasant odours, gain nutrition therefrom, and gain energy to effect their vigorous activity. The deodorising activity of the microorganisms will continue until the organic matter is completely exhausted.

Upon diffusion of the deodorant from the container in which it is accommodated, microorganisms included in the deodorant adsorb the organic matter which causes malodour, and catabolize and digest it.

Further, in accordance with the present invention, the deodorant in the container is absorbed in water holding material or materials comprising isobutylenemaleic anhydride copolymer crosslinked with sodium salt. In this connection, the deodorant will evaporate gradually from the surface of the water holding material so that the diffusivity of the deodorant will be controlled optimally. The deodorant may be substantially prevented from flowing out of the container while the container is tilted or tipped over, since the size of each particle of the water holding material is larger than that of the ventilating apertures provided through the lid.

While a particular embodiment of the present invention have been illustrated and described, it will be obvious to those skilled in the art that various changes and modifications can be made without departing from the spirit and scope of the invention.

## CLAIMS

1. A deodorant including microorganisms for catabolizing and digesting organic matter which causes odour.
2. A liquid deodorant comprising a deodorant as set forth in claim 1, accommodated within a container together with particles or the like of a water-holding material of a sufficient size to prevent them from passing out through ventilating apertures provided through a lid to be fitted over an upper opening of the body of the container.
- 5 3. The deodorant as set forth in claim 2, wherein said water-holding material comprises an isobutylene-maleic anhydride copolymer crosslinked with sodium salt.
- 10 4. The deodorant as set forth in claim 1 2, or 3, wherein said microorganisms are or include those which produce proteolytic enzyme.
- 5 5. The deodorant as set forth in claim 1, 2, or 3, wherein said microorganisms are or include those which produce lipolysis enzyme to catabolize vegetable or animal fat.
- 15 6. The deodorant as set forth in claim 1, 2 or 3, wherein said microorganisms are or include those which produce cellulolytic enzyme.
7. The deodorant as set forth in claim 1, 2 or 3, wherein said microorganisms include one or more of the following: microorganisms which 20 produce amylosis enzyme; microorganisms which produce proteolytic enzyme; microorganisms which produce lipolysis enzyme to catabolize vegetable or animal fat; and microorganisms which produce cellulolytic enzyme; in an optimum percentage.
- 25 8. A liquid deodorant accommodated within a container together with a particulate or like water-holding material of a size to prevent the particles or the like from flowing out through ventilating apertures provided through a lid to be fitted over an upper opening of the body of the container.
9. The deodorant as set forth in claim 8, wherein said water-holding

material comprises an isobutylene-maleic anhydride copolymer crosslinked with sodium salt.

10. Deodorants substantially as hereinbefore described with reference to the accompanying drawings.



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Application No: GB 9808206.8  
Claims searched: 1-7 & 10

Examiner: Gavin Dale  
Date of search: 25 June 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A5G (GD, GV)

Int Cl (Ed.6): A61L 9/01, 9/04, 9/12

Other: Online: WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
Y	US 4346840 (GAISER et al) See column 4 lines 59-67	2
X	WPI Abstract (GOTO S) Accession Number 97-188269 and JP 09048686 See WPI abstract and Japanese Patent Office Patent Abstract	1
X	WPI Abstract (OTA T) Accession Number 97-014845 and JP 08280381 See WPI abstract and Japanese Patent Office Patent Abstract	1,4,7
X	WPI Abstract (MITSUBISHI MATERIAL CORP) Accession Number 95-388829 and JP 07265400 See WPI abstract and Japanese Patent Office Patent Abstract	1
X, Y	WPI Abstract (ABE S) Accession Number 93-298948 and JP 05212098 See WPI abstract and Japanese Patent Office Patent Abstract	X:1 Y:2

X Document indicating lack of novelty or inventive step  
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A Document indicating technological background and/or state of the art.  
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